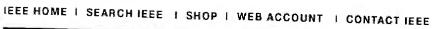


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Abstract: The growth of solid residues within PECVD (plasma enhanced chemical vapour deposition) reactors has been extensively studied because of its implications for wafer particle contamination and is often referred to as dusty plasmas. On dielectric CVD (DCVD) production systems the coating of chamber walls and vacuum exhaust line with residues addresses also the issue of system maintenance. A common solution consists of periodically cleaning the deposition chamber by ionizing a PFC (perfluoro-compound) gas such as CF4, NF3 or C2F6 This generates free fluorine radicals that dry etch the residues deposited on **chamber** walls . However, because of limited fluorine radical lifetime, this clean process is not efficient in the vacuum exhaust line where residues accumulate.

We propose an active solution to address the issue of solid waste treatment on a production DCVD system. We review the particular case of silicon nitride deposition, which is one of the worst known processes in terms of particle generation. These considerations are also valid for silicon oxide, silicon oxynitride, silicon carbide and amorphous silicon deposition processes. Here we report on our investigation on the particle formation, composition and morphology within a **PECVD** chamber and the deposition of these particles on chamber vacuum exhaust line. We describe a method to design an efficient precipitator that traps the particles immediately downstream of the deposition chamber . The trapping uses gravitational and electrostatic means. This system does not necessitate any disposal procedure because of its capability to perform an in situ plasma assisted clean, reactivating the effluent PFC gas from the processing chamber . Here, the system is referred to as downstream plasma apparatus

Identifiers -- KeyWord Plus(R): DUST PARTICLES; PLASMAS; DISCHARGES; DEPOSITION; TRANSPORT; CELL

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